UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
NEW ENGLAND – REGION 1
5 Post Office Square, Suite 100
Mail Code OSRR07-4
Boston, MA 02109-3912

February 24, 2017

James Cashwell
Olin Corporation
3855 North Ocoee Street
Suite 200
Cleveland, TN 37312

Subject: Evaluation of Early Action to Address Principal Threats in Groundwater
Olin Chemical Superfund Site, Wilmington, Massachusetts

Dear Mr. Cashwell:

At our meeting on October 18, 2016, EPA agreed to provide this letter explaining the need to conduct an evaluation of early action to address contaminant sources and principal threats in groundwater at the Olin Chemical Superfund Site (Site).

As you know, the schedule for completing the Operable Unit 3 (OU3) groundwater remedial investigation has been significantly delayed by contamination detected in the GW-413S/D/BR wells in January 2016. This well cluster was installed to close a data gap identified by EPA in the groundwater remedial investigation, with the expectation that results would show an unimpacted sentinel location for the northern boundary of the study area. Instead, elevated concentrations of N-Nitrosodimethylamine (NDMA) were detected in the deep overburden well screen GW-413D, and in the shallow bedrock well screen GW-413BR.

As a result, Olin Corporation (Olin) will soon be installing two new well clusters and sampling additional existing wells to the north and east of GW-413S/D/BR in an effort to determine the full nature and extent of contamination in this portion of the study area. Efforts in this area have already added a year to the overall project schedule. Should sample results from any of these pending well locations identify further Site-related impacts to groundwater, additional testing may be required, further delaying the project schedule.

During our October 18th meeting, we explained that EPA was planning to move forward with a feasibility study (FS) at this time with respect to: OU1 (Olin property), OU2 (off-property sediment and surface water) and a portion of OU3, including specifically defined groundwater parameters that Olin refers to as dense aqueous phase liquid "DAPL" and "DAPL pools." By doing so, EPA would expect this work to support a final ROD for OU1 and OU2, and an Interim ROD for OU3 DAPL defined areas only. An RI/FS and final ROD for the overall groundwater remedy would be deferred at this time.

The goal of this approach is to address those areas for which data is sufficient, minimize additional impacts to the aquifer, and allow the evaluation of interim actions to inform a final ROD for the overall groundwater remedy. The July 24, 2015 Remedial Investigation (RI) Report for OU1 and OU2 provide the data and analysis necessary to immediately prepare a Feasibility Study (FS) Report for OU1 and OU2. In addition, a focused RI Report could be developed for the DAPL in OU3 using the data and analysis contained in the July 2015 OU3 Data Gaps Work Plan, the November 2014 DAPL Pilot Extraction Report (as supplemented), and the October 2009 Focused Remedial Investigation Report, along with the new data to be collected in the next few weeks during the geoprobe study along Main Street to confirm the northern boundary of the Main Street DAPL pool. This Focused RI Report would then be used to support a FS for the DAPL in OU3 concurrent with the completion of the RI/FS for the overall groundwater remedy of OU3. The data and alternatives evaluation for the overall groundwater OU3 remedy are not required for an RI and FS regarding the DAPL pools.

As we understand it, Olin indicated at the October 18th meeting that it was prepared to move forward with a ROD for OU1 and OU2, and an Interim ROD for the Jewel Drive DAPL pool (also referred to as the Off-Property DAPL pool). It was Olin's stated position that the Jewel Drive DAPL pool requires remediation because it is believed to be a source for an ongoing release to the Upper South Ditch. However, Olin also stated that the other known areas of DAPL (currently referred to as the Main Street DAPL pool, the On-Property DAPL pool, and a DAPL area identified in GW-83D within the Maple Meadow Brook wetland complex as shown in the attached figure) are stable and do not impact potential receptors. Therefore, Olin argued that such DAPL areas do not require an early evaluation of remedial alternatives.

During the meeting, EPA maintained that all of the DAPL pools posed threats that warranted evaluation of early action under CERCLA and the NCP, but agreed to review the groundwater data and present further information on its basis for commencing an FS to support an Interim ROD for all of the DAPL areas. At this time, EPA has completed its review and confirms its view that an RI/FS that addresses all of the DAPL is the most prudent and protective way to proceed given the current schedule for completing the OU3 groundwater remedial investigation, and CERCLA guidance regarding principal threat waste and groundwater response actions. Further explanation is provided below.

1) **The DAPL Pools are a Principal Threat Waste that must be Addressed.**

EPA considers the DAPL to be a principal threat waste. The National Oil and Hazardous Substance Pollution Contingency Plan (NCP) sets out the expectation that EPA will use treatment to address principal threats posed by a site wherever practicable. 40 CFR § 300.430(a)(1)(iii)(A) ("EPA expects to use treatment to address the principal threats posed by a site, wherever practicable."). See also NCP preamble, 55 Fed. Reg. 8703 (March 8, 1990) ("EPA expects that treatment will be the preferred means by which to address the principal treats posed by a site, wherever practicable.").

As defined in EPA guidance:

> "Principal threat wastes are those source materials considered to be highly toxic or highly mobile that generally cannot be reliably contained or would present a significant risk to human health or the environment should exposure occur. They include liquids and other highly mobile materials (e.g., solvents) *or* materials having high concentrations of toxic compounds. No 'threshold level' of toxicity/risk has been established to equate to 'principal threat.' However, where toxicity and mobility of source materials combine to pose a potential risk of 10^{-3} or greater, generally treatment alternatives should be evaluated." OSWER 9380.3-06FS, *A Guide to Principal Threat and Low Level Threat Wastes,* November 1991, at 2.

EPA guidance also states that "[t]he concept of principal threat waste and low-level threat waste, as developed by EPA in the NCP and expanded in subsequent guidance, should be applied on a site-specific basis when characterizing 'source material.' Source material is defined as material that includes or contains hazardous substances, pollutants or contaminants that act as a reservoir for migration of contamination to groundwater, to surface water, to air, or acts as a source for direct exposure. Contaminated groundwater plumes are generally not considered to be source material, although nonaqueous phase liquids (NAPLs) in the groundwater generally would be viewed as source material. The manner in which principal threats are addressed generally will determine whether the statutory preference for treatment as a principal element is satisfied." OSWER Directive 9355.0-69, *Rules of Thumb for Superfund Remedy Selection,* August 1997, at 11-12. EPA notes that in the October 2009 Focused RI Report, Section 2.1.2.2, Olin identifies the DAPL pools as an ongoing source.

Finally, EPA guidance promotes early action to control principal threats thereby minimizing further possible impacts (see discussion below).

The DAPL pools at the Site contain high concentrations of NDMA and other Site-related compounds. The DAPL pools are not chemically stable, as demonstrated by the chemical diffusion process through which NDMA is being released into the broader groundwater plume. A preliminary evaluation shows that the elevated toxicity of Site-related compounds in the DAPL pools poses a risk greater than 10^{-3}. These factors demonstrate that the DAPL pools are an active principal threat waste source of migration to the surrounding groundwater plume and must be evaluated. According to the Focused RI Report, DAPL movement is independent of groundwater flow and the primary transport mechanism for DAPL was gravity which resulted in the formation of DAPL pools within bedrock depressions. Currently, the primary mechanism for release of these solutes from the DAPL is chemical diffusion. The diffusion process is significant as evidenced by the formation of a broad "diffuse" layer of groundwater. Diffuse groundwater also contains relatively elevated concentrations of Site-related compounds and, unlike DAPL, does migrate within the aquifer. Based on these facts, and the expectations and requirements specified in the NCP and relevant guidance, EPA believes that there is sufficient available information to develop and evaluate alternatives for addressing all DAPL pools as a principal threat. Early action to evaluate this principal threat waste may minimize further possible impacts to groundwater.

2) Early Evaluation of the DAPL Pools Should Be Conducted As Soon As Possible.

At the Olin Site, we anticipate that the goal of addressing contaminated groundwater will be restoration, and early evaluation of the DAPL sources should be conducted as soon as possible.

The NCP includes the following general expectations for groundwater restoration: "EPA expects to return useable ground waters to their beneficial uses wherever practicable, within a timeframe that is reasonable given the particular circumstances of the site. When restoration of groundwater to beneficial uses is not practicable, EPA expects to prevent further migration of the plume, prevent exposure to the contaminated groundwater, and evaluate further risk reduction." 40 CFR § 300.430(a)(1)(iii)(F).

As discussed in the NCP and in various associated guidance, there are in general, five key principles that support the overarching expectations for groundwater restoration. These key principles form the basis for EPA's cleanup decisions associated with groundwater contamination. OSWER Directive 9283.1-33, *Summary of Key Existing EPA CERCLA Policies for Groundwater Restoration*, which is attached to this letter, describes the key principles as follows:

i. If groundwater that is a current or potential source of drinking water is contaminated above protective levels (e.g., for drinking water aquifers, contamination exceeds Federal or State MCLs or non-zero MCLGs), a remedial action under CERCLA should seek to restore that aquifer to beneficial uses (e.g., drinking water standards) wherever practicable.

ii. Groundwater contamination should not be allowed to migrate and further contaminate the aquifer or other media (e.g., vapor intrusion into buildings; sediment; surface water; or wetlands).

iii. Technical impracticability (TI) waivers and other waivers may be considered, and under appropriate circumstances granted if the statutory criteria are met, when groundwater clean-up is impracticable; the waiver decision should be scientifically supported and clearly documented.

iv. Early actions (such as source removal, plume containment, or provision of an alternative water supply) should be considered as soon as possible. Institutional Controls (ICs) related to groundwater use or even surface use, may be useful to protect the public in the short-term, as well as in the long term.

v. ICs should not be relied upon as the only response to contaminated groundwater or as a justification for not taking action under CERCLA. To ensure protective remedies, CERCLA response action cleanup levels for contaminated groundwater should generally address all pathways of exposure that pose an actual or potential risk to human health or the environment.

Application of these principles to the Olin Site supports the need for an early evaluation of the restoration of groundwater. Restoration alternatives, however, cannot be evaluated until source control measures to remove, contain, or otherwise remediate DAPL are considered. Historical data confirm that the Town of Wilmington's primary drinking water supply was impacted by chemical compounds released from the Olin property. NDMA and other compounds were detected in active water supply wells at concentrations above protective levels. The Commonwealth of Massachusetts has published a drinking water guideline for NDMA of 10 nanograms per liter (ng/l). In 2003, NDMA was detected in four of the five municipal drinking water supply wells in the Maple Meadow Brook aquifer at concentrations of 166, 100, 38 and 32 ng/l. As a result of these detections, use of these municipal wells was discontinued. Data also demonstrates that the drinking water aquifer is contaminated by several other compounds in excess of Federal and State drinking water standards. These compounds are associated with releases from the Olin property and include 1,2-dichloroethane, benzene, chlorobenzene, methylene chloride, benzo(a)pyrene, bis(2-Ethylhexyl)phthalate, nitrate and chromium, to name just a few. In accordance with principle i., above, the expectation for this aquifer is that it should be restored to its beneficial use as a drinking water aquifer. Source control of the DAPL pools will be an essential element of any remedy selected to achieve this goal.

Olin funded a physical connection to an alternate water supply operated by the Massachusetts Water Resources Authority as an early action. However, existence of the water line does not eliminate the need for action under CERCLA. We note that certain Wilmington residents continue to use private drinking wells; the Town may seek to use its drinking water wells in the future; and the water line does not address contaminant migration. Concentrations of several compounds, and in particular NDMA, are significantly elevated within the DAPL pools. In 2012, NDMA was detected at both GW-44 and MP-3 #01DAPL at a concentration of 25,000 ng/l. These wells are located within the Main Street DAPL pool. These concentrations significantly exceed EPA's acceptable risk range. EPA has determined that an NDMA concentration of 25 ng/l equates to an excess lifetime (70yr) cancer risk of 10^{-4}, which is EPA's upper bound limit for unacceptable exposure (see EPA's attached analysis of risk). Similar concentrations have been detected in the other DAPL pools.

Furthermore, the DAPL pools continue to be an active source of contamination to the broader aquifer through chemical diffusion. Once in the diffuse and overlying groundwater, these chemicals freely migrate and continue to impact other parts of the aquifer, and the surface water and sediment in the Upper South Ditch. DAPL is present in the deepest layers of the aquifer and rests on top of bedrock, and is therefore presumably the primary source for migration of Site-related chemicals into bedrock fractures. Concentrations of NDMA and other Site-related compounds, have been detected in private drinking-water supply wells. These private wells are screened in deep bedrock confirming migration into bedrock fractures. In accordance with principles ii. and iv. above, an evaluation of early action to address the DAPL pools is necessary and appropriate.

Finally, the successful completion of the DAPL extraction pilot in 2014, and continued voluntary pump tests by Olin, confirm that source removal through DAPL recovery is potentially practicable. In short, there appears to be no basis for consideration of a TI waiver at this time.

Moreover, the pilot test provides information to support the evaluation of alternatives in the feasibility study. More information from the overall study of OU3 groundwater is not needed for the evaluation of the DAPL pools.

3) **MassDEP Has Determined that the Site Aquifer Has High Use and Value.**

EPA also relies on MassDEP's determination concerning the Site aquifer in determining that an early evaluation of the DAPL pools is necessary.

EPA policy dictates that EPA remediation programs should defer to State determinations of current and future groundwater uses, when based on an EPA-endorsed Comprehensive State Ground Water Protection Program (CSGWPP) that has provisions for site-specific decisions. OSWER Directive 9283.1-09, *The Role of CSGWPPs in EPA Remediation Programs,* April 1997, at 7. As a result, EPA remediation programs should assess site risks (e.g., the Baseline Risk Assessment for Superfund sites) and establish remediation objectives and/or cleanup levels consistent with the CSGWPP-determined groundwater uses. The Commonwealth of Massachusetts has a core CSGWPP endorsed by EPA and routinely issues Groundwater Use and Value determinations for CERCLA sites located in Massachusetts. Through this process, the Commonwealth considers such factors as potential receptors and aquifer yield to make a general determination of "High", "Medium" or "Low" use and value. The Massachusetts Department of Environmental Protection (MassDEP) compiled and reviewed relevant factors, and issued a "High" Groundwater Use and Value Determination for the Olin Chemical Superfund Site on September 21, 2010. A courtesy copy is attached.

As such, as noted above, EPA must evaluate actions to restore and protect this aquifer consistent with the State's designation. Evaluation of early action to address the ongoing sources of groundwater is prudent and consistent with EPA policy for protection of this high valued aquifer.

In summary, EPA does not agree with Olin's conclusion that the DAPL pools are stable and do not warrant early evaluation. Based on a review of the Site groundwater data and the applicable NCP regulations and guidance governing principal threat waste and groundwater response actions, EPA continues to conclude that an evaluation of early action to address all areas of DAPL is necessary. Furthermore, the DAPL extraction pilot work conducted thus far has demonstrated that removal of DAPL appears to be practicable and provides the information necessary to finalize a focused remedial investigation report for DAPL and a feasibility study for OU1, OU2 and DAPL on a faster schedule than currently planned for the rest of the contaminated groundwater in OU3.

Therefore, consistent with the RI/FS Administrative Settlement Agreement and Order on Consent, including Sections 1.I.C. and 1.III.E. of the Statement of Work, by March 10, 2017 Olin shall submit to EPA for review and approval (i) a preliminary draft of remedial alternatives for OU1, OU2 and OU3 DAPL pools (all areas of DAPL) and (ii) a schedule for the completion of the focused Remedial Investigation Report for the DAPL pools, a Feasibility Study Report for OU1, OU2 and the DAPL pools, and Remedial Investigation and Feasibility Study Reports for the overall OU3 groundwater remedy, consistent with the process outlined above.

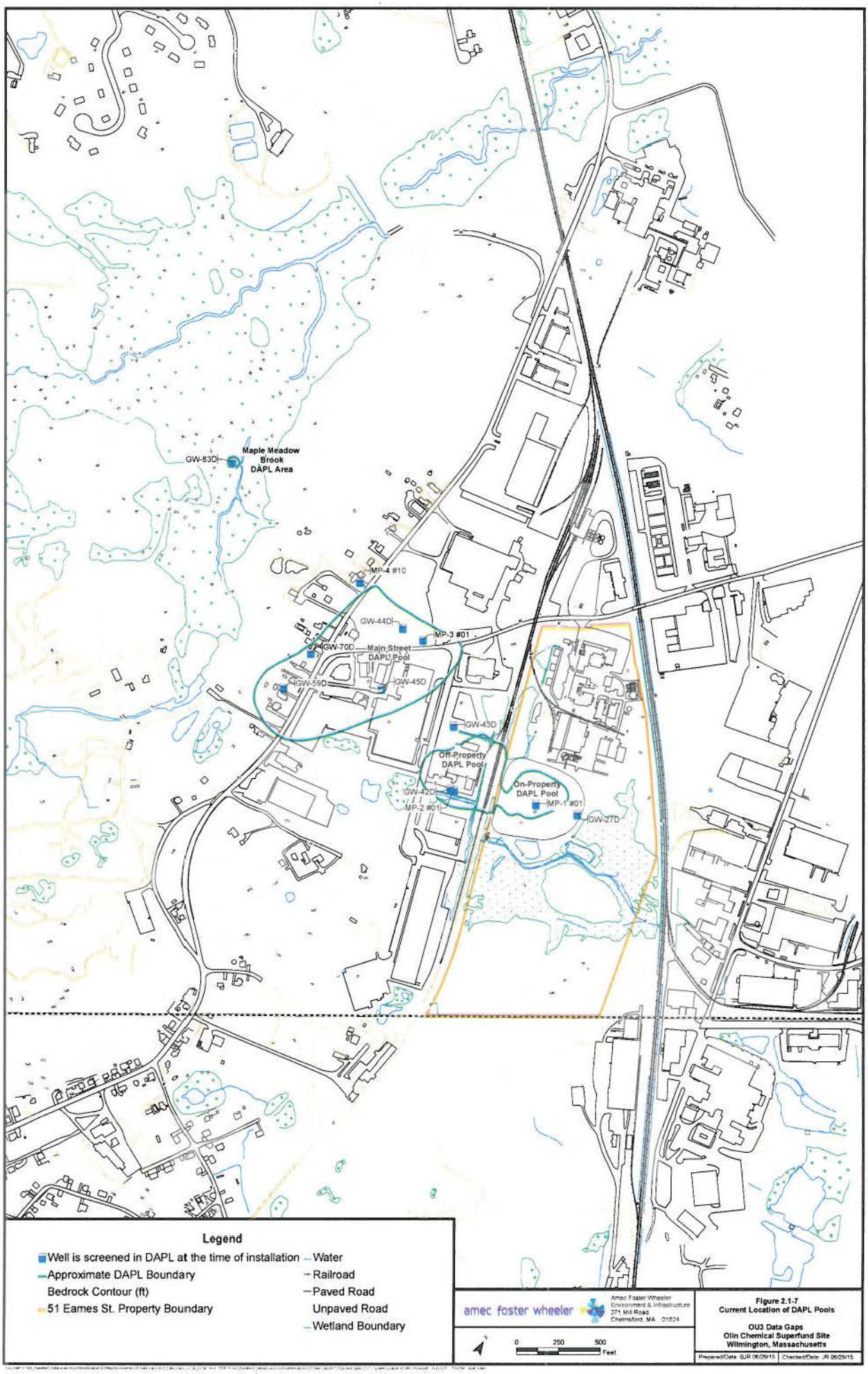
Please call me if you have any questions.

Sincerely,

James M. DiLorenzo
Remedial Project Manager
USEPA Region 1 - New England

Attachments: DAPL Pools Figure
NDMA Preliminary Lifetime Cancer Risk Analysis
MassDEP Groundwater Use and Value Determination
OSWER Directive 9283.1-33, *Summary of Key Existing EPA CERCLA Policies for Groundwater Restoration*, June 26, 2009

Cc: Lynne Jennings, EPA
Kevin Pechulis, EPA
Chris Smith, EPA
Garry Waldeck, MassDEP


GW-83D
Maple Meadow Brook DAPL Area
MP-4 #10
GW-44D
MP-3 #01
GW-70D
Main Street DAPL Pool
GW-59D
GW-45D
GW-43D
Off-Property DAPL Pool
On-Property DAPL Pool
GW-42D
MP-2 #01
MP-1 #01
GW-27D
Legend
Well is screened in DAPL at the time of installation
Approximate DAPL Boundary
Bedrock Contour (ft)
51 Eames St. Property Boundary
Water
Railroad
Paved Road
Unpaved Road
Wetland Boundary
amec foster wheeler
Amec Foster Wheeler Environment & Infrastructure 271 Mill Road Chelmsford, MA 01824
0 250 500 Feet
Figure 2.1-7
Current Location of DAPL Pools
OU3 Data Gaps
Olin Chemical Superfund Site
Wilmington, Massachusetts
Prepared/Date: BJR 06/29/15
Checked/Date: JR 06/29/15

Residential Drinking Water Ingestion Cancer Risk-Based Concentration for 1E-04 Cancer Risk and 70 year exposure
NDMA

Age	CW (mg/L)	IR [1] (L/day)	EF (days/yr)	ED (yr)	BW [2] (kg)	AT-c (days)	LADD (mg/kg-day)	SF $(mg/kg\text{-}day)^{-1}$	ADAF	ELCR
Birth to < 1 month	2.5E-05	0.839	350	0.08	4.8	25550	5.0E-09	5.1E+01	10	2.5E-06
1 to <3 months	2.5E-05	0.896	350	0.17	5.6	25550	9.1E-09	5.1E+01	10	4.7E-06
3 to < 6 months	2.5E-05	1.056	350	0.25	7.4	25550	1.2E-08	5.1E+01	10	6.2E-06
6 to < 12 months	2.5E-05	1.055	350	0.5	9.2	25550	2.0E-08	5.1E+01	10	1.0E-05
1 to < 2 years	2.5E-05	0.837	350	1	11.4	25550	2.5E-08	5.1E+01	10	1.3E-05
2 to < 3 years	2.5E-05	0.877	350	1	13.8	25550	2.2E-08	5.1E+01	3	3.3E-06
3 to <6 years	2.5E-05	1.078	350	3	18.6	25550	6.0E-08	5.1E+01	3	9.1E-06
6 to < 11 years	2.5E-05	1.235	350	5	31.8	25550	6.7E-08	5.1E+01	3	1.0E-05
11 to < 16 years	2.5E-05	1.727	350	5	56.8	25550	5.2E-08	5.1E+01	3	8.0E-06
16 to < 18 years	2.5E-05	1.983	350	2	71.6	25550	1.9E-08	5.1E+01	1	9.7E-07
18 to < 21 years	2.5E-05	2.54	350	3	71.6	25550	3.6E-08	5.1E+01	1	1.9E-06
21 to < 70 years	2.5E-05	2.54	350	49	71.6	25550	6.0E-07	5.1E+01	1	3.0E-05
									Total ELCR:	1.000E-04

[1] 95th percentile per capita ingestion from Table 3-1 CSEFH

[2] mean weight from Table 8-1 CSEFH

CW = Concentration in Water

IR = Ingestion Rate

EF = Exposure Frequency

ED = Exposure Duration

BW = Body Weight

AT-c = Averaging Time, cancer

LADD = Lifetime Average Daily Dose

SF = Oral Slope Factor

ELCR = Excess Lifetime Cancer Risk

ADAF = Age Dependent Adjustment Factor

CSEFH = Child-Specific Exposure Factors Handbook EPA/600/R-06/096F September 2008

$LADD = CW * IR * EF * ED * 1/BW * 1/AT\text{-}c$

$ILCR = \sum(LADD * SF * ADAF)$

COMMONWEALTH OF MASSACHUSETTS
EXECUTIVE OFFICE OF ENERGY & ENVIRONMENTAL AFFAIRS
DEPARTMENT OF ENVIRONMENTAL PROTECTION
ONE WINTER STREET, BOSTON, MA 02108 617-292-5500

DEVAL L. PATRICK
Governor

TIMOTHY P. MURRAY
Lieutenant Governor

IAN A. BOWLES
Secretary

LAURIE BURT
Commissioner

September 21, 2010

Robert Cianciarulo
U.S. EPA
Office of Site Remediation and Restoration
1 Congress Street
Suite 1100 (HBO)
Boston, MA 02114

RE: Groundwater Use and Value Determination
Olin Chemical Corporation

Dear Mr. Cianciarulo:

Enclosed please find the Groundwater Use and Value Determination for the Olin Chemical Corporation prepared by the Department of Environmental Protection (MassDEP). The Determination was conducted by the DEP pursuant to the Memorandum of Agreement (1998) between the U.S. Environmental Protection Agency and the MassDEP.

Should you have any questions, please contact Joe Coyne at 617-348-4066.

Sincerely,

Jay Naparstek
Deputy Division Director

e-file: 100813Use&Value OLIN

GROUNDWATER USE AND VALUE DETERMINATION
Olin Chemical Corporation Superfund Site

September 2010

Consistent with the Environmental Protection Agency's (EPA) 1996 Final Ground Water Use and Value Determination Guidance, the Department has developed a "Use and Value Determination" for the groundwater impacted by the Olin Chemical Corporation Superfund Site (the "Site"). The purpose of the Use and Value Determination is to identify whether the aquifer at and in the vicinity of the Site should be considered of "High", "Medium", or "Low" use and value. In the development of its determination, the Department has considered the criteria contained in the Guidance, as well as the criteria for groundwater classification as promulgated in the Massachusetts Contingency Plan (MCP). The classification contained in the MCP considers criteria similar to those recommended in the Use and Value Guidance. The Department's recommendation supports a high use and value for the Site area groundwater. An explanation for the determination is outlined below.

For the purpose of this Determination, the term Site will include the Olin property as well as additional areas where contamination has come to be located. The groundwater under evaluation is defined as the groundwater beneath the Site and the surrounding area as shown in the attached figure.

The Olin property covers approximately 50 acres of land in Wilmington, Massachusetts. Contamination has been detected at the Site in various media including groundwater, soils, sediments and surface water. Numerous organic contaminants (N-nitrodimethylamine, N-nitrosodiphenlyamine, bis-2-ethyl hexyl phthalate and trimethylpentenes) and inorganics contaminants (chromium, ammonia, sodium, sulfate, and nitrate) have been consistently detected in groundwater. In June 1990, an Aquifer Protection Study was conducted by IEP, which included the delineation of water supply Zone II areas in Wilmington. A Zone II is defined as an area of an aquifer that contributes water to a well under the most severe pumping and recharge conditions that can be reasonable estimated.

Also identified in the Aquifer Protection Study was the presence of a groundwater divide that runs roughly east/west across the northern portion of the Site. This divide separates the Ipswich Drainage Basin to the north from the Aberjona River Watershed to the south. The area to the north of this groundwater divide (in the Ipswich Drainage Basin) is classified as Zone II.

There are three MCP groundwater classifications at the Site; GW-1, GW-2, and GW-3. In general, areas that are located within a Current or Potential Drinking Water Source area are classified as GW-1. This includes areas that fall within a delineated Zone II. GW-2 classification occurs where there is a potential for migration of vapors from

groundwater to occupied or planned structures. The classification applies to locations where groundwater has an average annual depth of 15 feet or less and where there is an occupied or planned building or structure within a 30-foot surface radius of the groundwater. All other areas are considered GW-3. Areas within the delineated Zone II across the northern portion of the Site are classified as GW-1 as a current drinking water source area. Additionally, areas within 500 feet of any private wells are also considered GW-1 areas. Active private potable wells are located on Cook Street in the vicinity of the site. The remainder of the Site groundwater is categorized as GW-2/GW-3. Roughly 1500 feet to the south is an area also classified as GW-1 as a high yield aquifer and a Potential Drinking Water Source Area (See Attached Resource Map).

Because a portion of the Site falls within a GW-1 area, (the Zone II to the north) and the close proximity to private drinking water wells to the southeast and the GW-1 Potential Drinking Water Source Area to the south, and in light of the factors contained in EPA's Final Ground Water Use and Value Determination Guidance, the Department supports a high use and value for the Site area aquifer (See Attached Table: Groundwater Use and Value Factors) .

For the purposes of the risk assessment of the Site area groundwater, the groundwater risk evaluation for the Site should include, but is not limited to, the following:

Human Health:

a) Active and Potential drinking water
b) Vapor seepage into buildings,
c) Use of the water in industrial processes,
d) Excavation into groundwater (i.e., worker exposure),
e) Discharge to surface water (and the consequential effects of the discharge--i.e. wading scenarios, recreation, fishing).

Groundwater Use and Value Factors				
Factors	High	Medium	Low	Comments
1. Quantity	X			High to medium yield on the northern portion of the site, low yield on the southern portion of the site.
2. Quality	X			Groundwater in the vicinity of the site is used for private potable drinking water.
3.Current Public Water Supply Systems	X			There are no public water supply wells onsite but there is a Zone II located on the northern portion of the property.
4. Current Private Drinking Water Supply Wells	X			There are private drinking water wells in the proximity of the site.
5. Likelihood and I.D. of Future Drinking Water Use		X		There are potential water supply development areas to the north and the south of the site.
6. Other Current or reasonable Expected Groundwater Use(s) in Review Area	X			There are private and irrigation wells in the vicinity of the site.
7. Ecological Value		X		Surface water on the site flows to the south ditch which flows off property to the East Ditch to the New Boston Drainway then to Halls Brook.
8. Public Opinion		X		Public comment has indicated concerns over groundwater contamination and loss of public wells due to contamination.

MassDEP - Bureau of Waste Site Cleanup

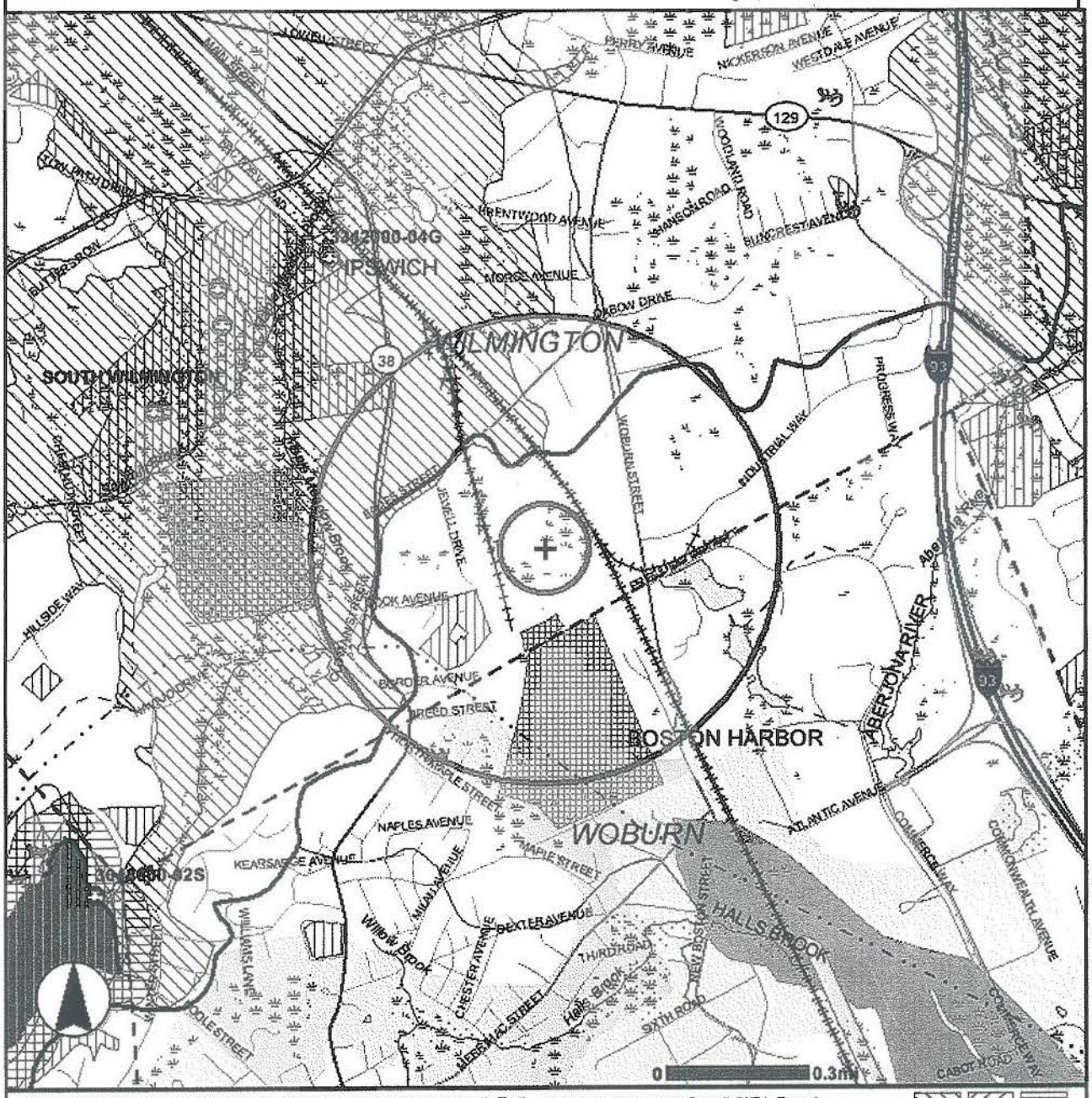
MCP Numerical Ranking System Map: 500 feet & 0.5 Mile Radii

Site Name:
Olin Chemical NPL Site
Wilmington, MA
RTN:
NAD83 MA Coordinates:
228556mE, 919523mN

September 16, 2010

The information shown on this map is the best available at the date of printing. For more information please refer to www.mass.gov/mgis/massgis.htm

MassDEP
Commonwealth of Massachusetts
Department of Environmental Protection



Roads: Limited Access, Divided, Other Hwy, Major Road, Minor Road, Track, Trail

Boundaries: Town, County, DEP Region; Train; Powerline; Pipeline; Aqueduct

Basins: Major, Sub; Streams: Perennial, Intermittent, Man Made Shore, Dam

Aquifers: Medium Yield, High Yield, EPA Sole Source

Non Potential Drinking Water Source Area: Medium, High (Yield)

PWS Protection Areas: Zone II, IWPA, Zone A

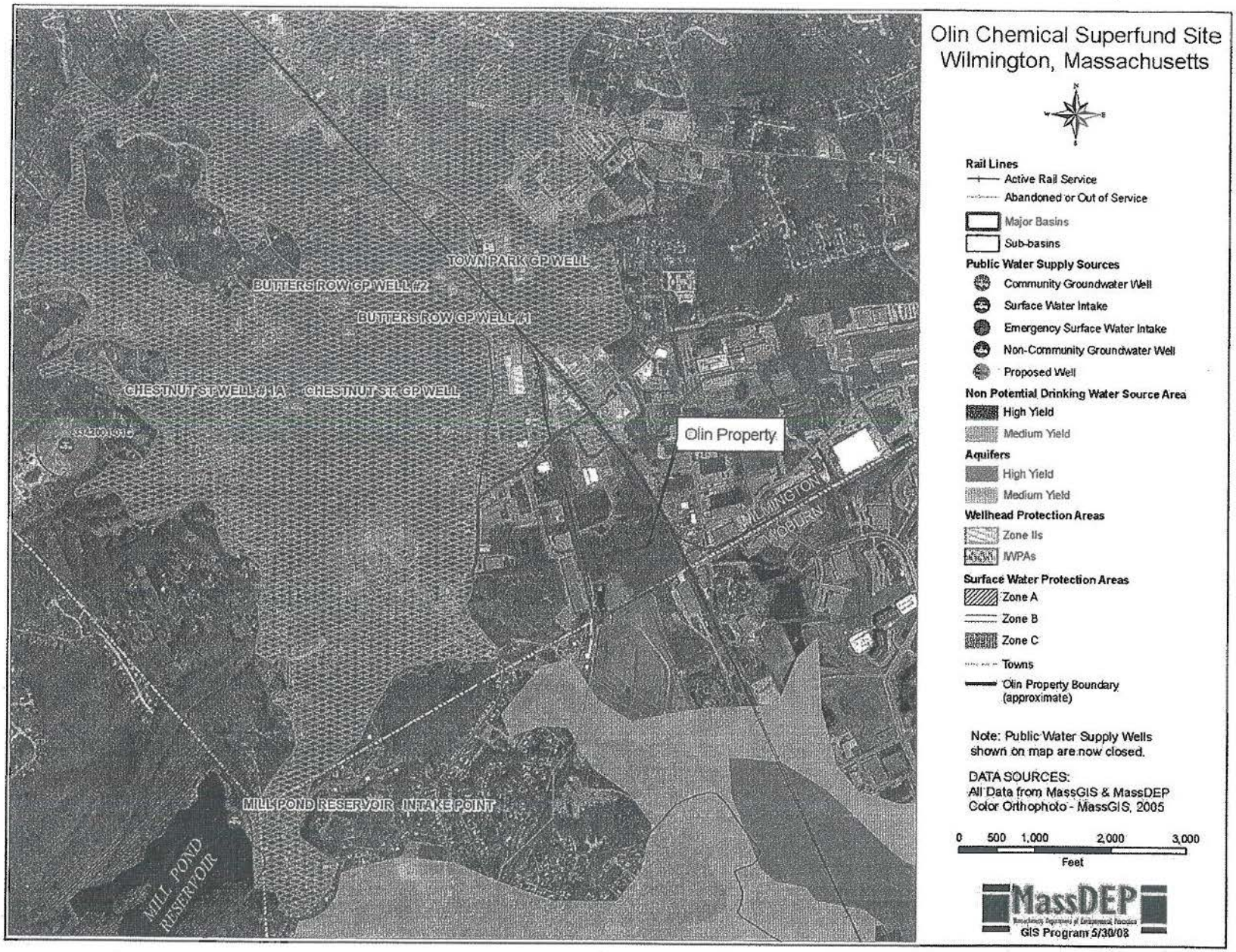
Hydrography: Open Water, PWS Reservoir, Tidal Flat

Wetlands: Freshwater, Saltwater, Cranberry Bog

FEMA 100yr Floodplain; Protected Open Space; ACEC

NHESP: Est Rare Weland Habitat, Certified Vernal Pool

DEP Permitted Solid Waste Landfill


Olin Chemical Superfund Site
Wilmington, Massachusetts
Rail Lines
Active Rail Service
Abandoned or Out of Service
Major Basins
Sub-basins
Public Water Supply Sources
Community Groundwater Well
Surface Water Intake
Emergency Surface Water Intake
Non-Community Groundwater Well
Proposed Well
Non Potential Drinking Water Source Area
High Yield
Medium Yield
Aquifers
High Yield
Medium Yield
Wellhead Protection Areas
Zone IIs
IWPAs
Surface Water Protection Areas
Zone A
Zone B
Zone C
Towns
Olin Property Boundary (approximate)
Note: Public Water Supply Wells shown on map are now closed.
DATA SOURCES:
All Data from MassGIS & MassDEP
Color Orthophoto - MassGIS, 2005
0 500 1,000 2,000 3,000
Feet
MassDEP
GIS Program 5/30/08
TOWN PARK GP WELL
BUTTERS ROW GP WELL #2
BUTTERS ROW GP WELL #1
CHESTNUT ST WELL #1A
CHESTNUT ST. GP WELL
Olin Property
WILMINGTON
WOBURN
MILL POND RESERVOIR INTAKE POINT
MILL POND RESERVOIR

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
WASHINGTON, D.C. 20460

JUN 26 2009

OFFICE OF
SOLID WASTE AND EMERGENCY
RESPONSE

OSWER Directive
9283.1-33

MEMORANDUM

SUBJECT: Summary of Key Existing EPA CERCLA Policies for Groundwater Restoration

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TO: Superfund National Policy Managers, Regions 1 - 10

Purpose

The mission of the Superfund program is to protect human health and the environment, consistent with the Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA),[1] as implemented by the National Oil and Hazardous Substance Pollution Contingency Plan (NCP), in part by restoring contaminated groundwaters to beneficial use. The purpose of this memorandum is to provide a compilation of some key existing EPA groundwater policies to assist EPA Regions in making groundwater restoration decisions pursuant to CERCLA and the NCP. In addition, by providing this information in a single document, it may serve to enhance the transparency and understanding, by the public, state regulators and others, of EPA's clean up decisions related to groundwater.[2]

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[1] This document provides guidance to Regional staff regarding how the Agency intends to interpret and implement the National Oil and Hazardous Substance Pollution Contingency Plan (NCP) which provides the blueprint for CERCLA implementation. However, this document does not substitute for those provisions or regulations, nor is it a regulation itself. Thus it cannot impose legally binding requirements on EPA, states, or the regulated community, and may not apply to a particular situation based upon the circumstances. Any decisions regarding a particular situation will be made based on the statute and the regulations, and EPA decision-makers retain the discretion to adopt approaches on a case-by-case basis that differ from the guidance where appropriate

[2] *See* 74 FR 4685-4686 (January 26, 2009) Memoranda from President Obama to the Heads of Executive Departments and Agencies "Transparency and Open Government" (signed January 21, 2009). For example: *Government should be transparent. Transparency promotes accountability and provides information for citizens*

This memorandum brings together and highlights some of the basic principles related to groundwater restoration that are articulated in multiple existing Agency guidance documents, including those related more generally to cleanup actions. It does not create any new guidance to the EPA regions; rather this memorandum addresses some of the key overall principles for groundwater remedial actions, as well as important concepts related to the following:

- Whether CERCLA remedial action is warranted
- Appropriate role of institutional controls (ICs)
- Groundwater classification and beneficial use policy
- Remedial action cleanup levels
- Groundwater point of compliance

In working with other Federal agencies to make groundwater clean up decisions at sites where the other Federal agency is lead for cleanup, EPA Regions should use the principles highlighted in this document to the same extent as at non-federal facility sites.[3] Section 120(a)(2) of CERCLA provides that all guidelines, rules, regulations, and criteria for preliminary assessments, site investigations, National Priorities List (NPL)[4] listing, and remedial actions are applicable to Federal facilities to the same extent as they are applicable to other facilities. It states the following: "No department, agency, or instrumentality of the United States may adopt or utilize any such guidelines, rules, regulations, or criteria which are inconsistent with the guidelines, rules, regulations, and criteria established by the Administrator under this Act."

Background

Groundwater response actions under CERCLA are governed in part by the following mandate established by Congress in CERCLA 121(d)(2)(A):

> ...Such remedial action shall require a level or standard of control which at least attains Maximum Contaminant Level Goals established under the Safe Drinking Water Act and water quality criteria established under section 304 or 303 of the Clean Water Act, where such goals or criteria are relevant and appropriate under the circumstances of the release or potential release.

This requirement is reflected in the NCP as follows: "Maximum contaminant level goals (MCLGs), established under the Safe Drinking Water Act, that are set at levels above zero, ..." or "maximum contaminant level (MCL) shall be attained where relevant and appropriate to the circumstances of the release..."[5]

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about what their Government is doing. Information maintained by the Federal Government is a national asset. My Administration will take appropriate action, consistent with law and policy, to disclose information rapidly in forms that the public can readily find and use. See also memorandum from EPA Administrator Lisa Jackson to EPA Employees (April 23, 2009)

[3] CERCLA Section 120(e)(4))A) provides a role for EPA in the selection of remedies at Federal facilities on the National Priorities List.

[4] *See* 55 FR 8666-8865 (March 8, 1990).

[5] 40 CFR §300.430(3)(B) and (C).

Consistent with CERCLA and the NCP, Superfund response actions protect human health and the environment in a number of ways, such as by remediating contaminated soils, restoring contaminated groundwaters to their beneficial uses, preventing migration of contaminant plumes, and protecting groundwater and other environmental resources. To ensure protective remedies, CERCLA response actions that clean up contaminated groundwater generally address all pathways of exposures that pose an actual or potential risk to human health and the environment. For example, groundwater response actions should generally address the actual or potential direct contact risk posed by contaminated groundwater (e.g., human consumption, dermal contact, or inhalation), and also should consider the potential for the contaminated groundwater to serve as a source of contamination into other media (e.g., for vapor intrusion into buildings; sediment; surface water; or wetlands).

The NCP establishes general expectations for purposes of groundwater restoration as follows:

> EPA expects to return usable ground waters to their beneficial uses wherever practicable, within a timeframe that is reasonable given the particular circumstances of the site. When restoration of ground water to beneficial uses is not practicable, EPA expects to prevent further migration of the plume, prevent exposure to the contaminated ground water, and evaluate further risk reduction.[6]

Recognizing that groundwaters of the United States are valued natural resources, the Agency carries out CERCLA response actions in a manner that ensures Superfund remedies are protective by, among other things, restoring contaminated groundwater to beneficial uses. Generally, these response actions attain MCLs (and non-zero MCLGs, where appropriate) for current or potential drinking water aquifers.

Principles for Groundwater Remediation

As discussed in the NCP and in various associated guidance, there are in general, five key principles that stem from the overarching expectations for groundwater restoration. These are as follows:

1) If groundwater that is a current or potential source of drinking water is contaminated above protective levels (e.g., for drinking water aquifers, contamination exceeds Federal or State MCLs or non-zero MCLGs), a remedial action under CERCLA should seek to restore that aquifer to beneficial use (e.g., drinking water standards) wherever practicable.
2) Groundwater contamination should not be allowed to migrate and further contaminate the aquifer or other media (e.g., vapor intrusion into buildings; sediment; surface water; or wetland).
3) Technical impracticability waivers and other waivers may be considered, and under appropriate circumstances granted if the statutory criteria are met, when groundwater clean up is impracticable; the waiver decision should be scientifically supported and clearly documented.

[6] 40 CFR §300.430(a)(1)(iii)(F).

4) Early actions[7] (such as source removal, plume containment, or provision of an alternative water supply[8]) should be considered as soon as possible. ICs related to groundwater use or even surface use, may be useful to protect the public in the short-term, as well as in the long-term.
5) ICs should not be relied upon as the only response to contaminated groundwater or as a justification for not taking action under CERCLA.[9] To ensure protective remedies, CERCLA response action cleanup levels for contaminated groundwater should generally address all pathways of exposure that pose an actual or potential risk to human health and the environment.

In addition, the state or tribe with jurisdiction over the groundwater often can have an important role in framing EPA's approach to groundwater characterization and remediation under Superfund. For example, states and tribes may have antidegradation or similar regulations or requirements that may be potential applicable, or relevant and appropriate requirements (ARARs). How state and tribal groundwater policies potentially impact remediation decisions is discussed later in this guidance.

Whether CERCLA Remedial Action is Warranted

The NCP preamble states, "The results of the baseline risk assessment are used to determine whether remediation is necessary, to help provide justification for performing remedial action, and to assist in determining what exposure pathways need to be remediated."[10] In the "Role of the Baseline Risk Assessment in Superfund Remedy Selection Decisions" (OSWER Directive 9355.0-30, April 22, 1991) (see http://www.epa.gov/oswer/riskassessment/pdf/baseline.pdf), the Agency further clarified this policy:

> Chemical-specific standards that define acceptable risk levels (e.g., non-zero MCLGs, MCLs) also may be used to determine whether an exposure is associated with an unacceptable risk to human health or the environment and whether remedial action under Section 104 or 106 is warranted. For ground water action, MCLs and non-zero MCLGs will generally be used to gauge whether remedial action is warranted.

In addition, the NCP preamble notes that regulations that help define protectiveness (e.g., MCLs) also may help ascertain whether a remedial action taken at a site remains protective for CERCLA purposes.[11]

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[7] See "Considerations in Ground-Water Remediation at Superfund Sites and RCRA Facilities – Update" (Directive Number 9283.1-06, May 27, 1992) for a more complete discussion of early actions. (See pages 6-8.)
[8] *See* 55 FR 8865 (March 8, 1990) for a list of potential ways of providing an alternative water supply (Appendix D)
[9] *See* 40 CFR § 300.430(a)(iii)(D) ("The use of institutional controls shall not substitute for active response measures (e.g., treatment and/or containment of source material, restoration of ground waters to their beneficial uses) as the sole remedy unless such active measures are determined not to be practicable, based on the balancing of trade-offs among alternatives that is conducted during the selection of remedy.") Also see 40 CFR § 300.430(a)(iii) (A) related to the expectation for treatment.
[10] *See* 55 FR 8709 (March 8, 1990).
[11] In the context of post-ROD changes, the NCP preamble notes: "... a remedy must be modified if necessary to protect human health and the environment; newly promulgated or modified requirements contribute to that

A CERCLA remedial action generally is appropriate[12] in various circumstances, including: a regulatory standard that helps define protectiveness (e.g., a federal or state MCL or nonzero MCLG for current or potential drinking water aquifers) is exceeded; when the estimated risk calculated in a risk assessment exceeds a noncarcinogenic level for an adverse health effect or the upper end of the NCP risk range for "cumulative carcinogenic site risk to an individual based on reasonable maximum exposure for both current and future land use[13]"; the non-carcinogenic hazard index is greater than one (using reasonable maximum exposure assumptions for either the current or reasonably anticipated future land use); or the site contaminants cause adverse environmental impacts.[14] It is important to note that all conditions do not need to be present for action and the conditions may be independent of each other.

Under existing Agency policy, groundwaters that are current or potential sources of drinking water that exceed risk-based standards (e.g., MCLs) or pose an unacceptable risk generally warrant a remedial action under CERCLA. Other routes of exposure, such as vapor intrusion, or current or potential threat to sediment quality, surface water quality, wetlands or critical habitats for protected species, also may be the basis for remedial action under CERCLA.

Appropriate Role of ICs

While ICs related to groundwater or surface use may be used as part of a response action, the NCP preamble indicates that ICs generally are not to be included when evaluating whether a CERCLA remedial action is appropriate in the first place.[15] In addition, the NCP preamble[16] states that "[t]he baseline assessment is essentially an evaluation of the no-action alternative. Institutional controls, while not actively cleaning up the contamination at the site, can control exposure and, therefore, are considered to be limited action alternatives."[17] Therefore, the baseline assessment should not include the impact of potential or existing ICs.

Furthermore, an IC by itself generally should not substitute for active remediation[18] of groundwater. The NCP preamble states: "Institutional controls will usually be used as supplementary protective measures during implementation of ground-water remedies."[19]

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evaluation of protectiveness." *See* 55 FR 8758 (March 8, 1990).

[12] *See* "Rules of Thumb for Superfund Remedy Selection" OSWER Directive 9355.0-69 (August 1997)

[13] *See* "Role of the Baseline Risk Assessment in Superfund Remedy Selection Decisions" OSWER Directive 9355.0-03 (April 22, 1991).

[14] *See* "Rules of Thumb for Superfund Remedy Selection" OSWER Directive 9355.0-69 (August 1997)

[15] *See* 55 FR 8710- 8711, (March 8, 1990).

[16] *See* 55 FR 8711 (March 8, 1990)

[17] Some Regions have incorrectly identified remedies requiring only institutional controls as "no action" remedies. For further information and guidance regarding ICs, see http://www.epa.gov/superfund/policy/ic/guide/index.htm

[18] *See* 40 CFR § 300.430(a)(iii)(D) ("The use of institutional controls shall not substitute for active response measures (e.g., treatment and/or containment of source material, restoration of ground waters to their beneficial uses) as the sole remedy unless such active measures are determined not to be practicable, based on the balancing of trade-offs among alternatives that is conducted during the selection of remedy.")

[19] *See* 55 FR 8732 (March 8, 1990).

While there may be limited circumstances where an IC-only final remedy[20] is appropriate, generally an IC-only ROD would follow selection of other remedial action elements in previous decision documents. For example, previous decision documents may have selected active remediation that included removal of sources contributing to groundwater contamination, may have addressed groundwaters to the extent practicable, and may have invoked a TI waiver of ARARs for specific contaminants in one part of an aquifer. Where the cleanup under previous decision documents has not ensured protection of human health for that part of the groundwater that will not achieve MCLs, a separate decision document would generally be issued to select one or more ICs to prevent current or future exposure to contaminated groundwater.

Where a Region is considering an IC-only ROD that is also an IC-only remedy for all or a portion of a site for groundwater, the Region should consult early with the appropriate Regional Coordinator from Office of Superfund Remediation and Technology Innovation (OSRTI) or Federal Facilities Restoration and Reuse Office (FFRRO). This consultation is intended to ensure that the decision making process appropriately evaluates and properly documents key aspects that may be associated with the remedy selection process leading to an IC-only remedy. This evaluation may include consideration of source removal, active remediation, granting a Technical Impracticability (TI) waiver [21] for applicable and relevant and appropriate requirements (ARARs), or adopting monitored natural attenuation[22] (MNA)).

Groundwater Classification and Beneficial Use Policy

The NCP states that "EPA expects to return usable ground waters to their beneficial uses wherever practicable, within a timeframe that is reasonable given the particular circumstances of the site."[23] This policy often hinges on the determination of the current or potential use of the groundwater aquifer. The NCP preamble states:

> ...to the degree that the state or local governments have classified their ground water, EPA will consider these classifications and their applicability to the selection of an appropriate remedy... If a state classification would lead to a less stringent solution than the EPA classification scheme, then the remediation goals will generally be based on EPA classification. Superfund remedies must be protective. If the use of state classification would result in the selection of a nonprotective remedy, EPA would not follow the state scheme.[24]

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[20] An IC-only ROD is a decision document that is only selecting an institutional control to achieve protectiveness for the current or reasonably anticipated land, ground water or surface water use. It normally does not mean a decision document that selects ICs together with other actions, such as monitored natural attenuation or ground water pump and treat.

[21] *See* "Consistent Implementation of the FY 1993 Guidance on Technical Impracticability of Ground-Water Restoration at Superfund Site" (Directive Number 9200.4-14, Jan. 19, 1995) and "Guidance for Evaluating the Technical Impracticability of Ground-Water Restoration" (Directive Number 9234.2-25, Sept. 1993). For further information see http://www.epa.gov/superfund/health/conmedia/gwdocs/arars.htm

[22] "Use of Monitored Natural Attenuation at Superfund, RCRA Corrective Action, and Underground Storage Tank Sites" (OSWER Directive 9200.4-17P, April 21, 1999) clarifies EPA policy regarding the use of MNA for soils and groundwater. For further information see http://www.epa.gov/superfund/health/conmedia/gwdocs/monit.htm

[23] 40 CFR § 300.430(a)(1)(iii)(F).

[24] *See* 55 FR 8733 (March 8, 1990).

The NCP preamble also states that if such groundwater classification, as discussed above, is not available, then "[a] determination is made as to whether the contaminated ground water falls within Class I, II, or III. Guidance for making this determination is available in "EPA Guidelines for Ground-Water Classification" (1986 Federal Guidelines) (Final Draft, December, 1986).[25]

The NCP preamble guides almost all EPA groundwater classification and beneficial use decisions for CERCLA response actions. In States that have an EPA-endorsed Comprehensive State Ground Water Protection Program (CSGWPP), however, EPA's guidance entitled: "The Role of CSGWPP in EPA Remediation Programs" (April 4, 1997, OSWER Directive 9283.1-09) builds on the NCP preamble with respect to the State role. The guidance[26] states:

Superfund and other EPA remediation programs should generally defer to a State's determination of current and future groundwater uses, when based on criteria or methodology that 1) are specified in an EPA-endorsed Core CSGWPP, and 2) can be applied at specific sites or facilities.

It further clarifies:

> For States that do not have an EPA-endorsed CSGWPP, or for CSGWPPs that do not have provisions for making site-specific determinations of ground water use (or resource value, priority or vulnerability), the Superfund program will continue to follow guidance provided in the NCP Preamble.

Land use is not identified as a consideration in making groundwater classifications. The CSGWPP Guidance and the 1986 Federal Guidance, as well as other EPA guidance related to groundwater cleanups under CERCLA authority, are available on the "Key OSWER Ground Water Guidances and Reports" on EPA's web page http://www.epa.gov/superfund/health/conmedia/gwdocs/.

In summary, groundwaters should be restored to their beneficial use. While a State's designation of groundwater use will be considered for establishing remediation goals, EPA's classification scheme (*EPA Guidelines for Ground-Water Classification* (Final Draft, December 1986)) will generally be used if a state's classification would lead to a less stringent solution. In 1997, EPA initiated a policy of deferring to a State's determination of current and future groundwater uses, when based on criteria or methodology that are specified in an EPA endorsed CSGWPP, and can be applied at specific sites or facilities.

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[25] *See* 55 FR 8732 (March 8, 1990). Class I and II are considered to be current and potential drinking water aquifers.

[26] "The Role of CSGWPPS in EPA Remediation Programs," (OSWER Directive 9283.1-09) April 4, 1997..

Remedial Action Cleanup Levels

Pursuant to CERCLA section 121, all Superfund remedial actions must be protective of human health and the environment and must comply with ARARs.[27] As noted previously, CERCLA 121(d) specifically identifies Safe Drinking Water Act MCLs and nonzero MCLGs, as well as Clean Water Act Water Quality Criteria as potentially relevant and appropriate standards to be attained by the remedial action. In addition, the NCP states:

Maximum contaminant level goals (MCLGs), established under the Safe Drinking Water Act, that are set at levels above zero, shall be attained by remedial actions for ground or surface waters that are current or potential sources of drinking water, where the MCLGs are relevant and appropriate under the circumstances of the release based on the factors in 300.400(g)(2). If an MCLG is determined not to be relevant and appropriate, the corresponding maximum contaminant level (MCL) shall be attained where relevant and appropriate to the circumstances of the release.[28]

The NCP preamble further clarifies that:

> EPA's policy is that MCLs or MCLGs above zero should generally be the relevant and appropriate requirement for ground water that is or may be used for drinking, and that a waiver is generally needed in situations where a relevant and appropriate MCL or non-zero MCLG cannot be attained."[29]

Where groundwaters may impact surface water quality, "water quality criteria established under section 304 or 303 of the Clean Water Act," may be relevant and appropriate standards consistent with CERCLA §121(d)(2)(A)(ii).

Cleanup levels for remedial actions under CERCLA generally are developed based on site-specific risk assessments, ARARs[30], and/or to-be-considered materials (TBCs).[31] Where

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[27] Under CERCLA section 121(d)(4), an ARAR may be waived under certain circumstances. See 40 CFR 300.430(f)(1)(i)(A) and See 40 CFR 300.430(f)(1)(1)(ii)(B). The NCP further states "On-site remedial action selected in a ROD must attain those ARARs that are identified at the time of the ROD signature or provide grounds for a waiver.."

[28] *See* 40 CFR 300.430(e)(2)(i)(B)

[29] *See* 55 FR 8754 (March 8, 1990).

[30] In situations where two or more regulations are found to constitute ARARs for the CERCLA response, the cleanup level should be established as the more stringent of the levels. For example, the "Use of Uranium Drinking Water Standards under 40 CFR 141 and 40 CFR 192 as Remediation Goals for Groundwater at CERCLA Sites" (Directive No. 9283.1-14, Nov. 6, 2001, page 6), states: "...the CERCLA approach for complying with the MCL throughout the plume is more stringent than the UMTRCA approach of complying with the groundwater standard only in the uppermost aquifer. Thus if an MCL is attained through the plume, the groundwater standard will also be attained in the uppermost aquifer." The same is true for any state ARAR that is more stringent than the Federal ARARs and the remedy would need to meet the more stringent cleanup levels.

[31] "To-be-considered material (TBCs) typically are non-promulgated advisories or guidance issued by Federal or State governments that are not legally binding and do not have the status of potential ARARs. However, TBCs will be considered along with ARARs as part of the site risk assessment and may be used in determining the necessary level of cleanup for protection of health and the environment" "Establishment of Cleanup Levels for CERCLA sites with Radioactive Contamination" (OSWER Directive No. 9200.4-18, Aug. 22, 1997, page 2). See also 40 CFR §

ARARs are not available or are not sufficiently protective. EPA generally sets site-specific remediation levels for: 1) carcinogens at a level that represents an excess upper bound lifetime cancer risk to an individual of between 10^{-4} to 10^{-6}; and for 2) non-carcinogens such that the cumulative risks from exposure will not result in adverse effects to human populations (including sensitive sub-populations) that may be exposed during a lifetime or part of a lifetime, incorporating an adequate margin of safety.[32] As noted in that guidance, Regions should consult with Headquarters before making a site-specific determination that a specific ARAR is not protective of human health and the environment.

CERCLA cleanup levels are designed to address all reasonably anticipated routes of exposure that may pose an actual or potential risk to human health or the environment. For example, Regions should ensure that cleanup levels established to restore groundwater to beneficial use, consistent with the NCP (e.g., restoration to MCLs for current or potential drinking water aquifers), also adequately address other routes of exposure associated with the groundwater, including groundwaters as a source of contamination to other media (e.g., for vapor intrusion into buildings; sediment; surface water; wetlands).

As discussed above, groundwater cleanup levels are established based on promulgated standards (e.g., Federal or State MCLs or non-zero MCLGs, or other standards found to be ARARs), or risk-based levels (e.g., for contaminants when there are no standards that define protectiveness).

Groundwater Area of Attainment or Point of Compliance

The NCP preamble[33] uses both "area of attainment" and "point of compliance"[34] in discussing where groundwater cleanup levels are to be achieved. The area of attainment/point of compliance is important in the overall framework of developing and implementing cleanup of a contaminated aquifer. The NCP preamble sets forth the Agency's policy that for groundwater,

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300.400(g)(3) and CERCLA Compliance with Other Laws Manual: Interim Final (EPA/540/6-89/006, Aug. 1988), at 1-76.

[32] *See* 40 CFR §300.430(e)(2)(i)(A)(1) and (2). Also see "Clarification of the Role of Applicable, or Relevant and Appropriate Requirements in Establishing Preliminary Remediation Goals under CERCLA" (OSWER 9200.4-23, Aug. 22, 1997). "It remains EPA's policy that ARARs will generally be considered protective absent multiple contaminants or pathways of concern. . .in rare situations, EPA Regional offices should establish PRGs [preliminary remediation goals] at levels more protective than required by a given ARAR, even absent multiple pathways or contaminants, where application of the ARAR would not be protective of human health or the environment. This judgment should be made based on a review of the level of risk associated with application of the ARAR; the soundness of the technical basis for the ARAR, and other factors relating to the ARAR or to its application at an individual site."

[33] "See "Guidance on Remedial Actions for Contaminated Ground Water at Superfund Sites" (OSWER Directive 9283.1-2, December 1988, p. xv) where the area of attainment is defined as "[t]he area of the plume outside the boundary of any waste to be managed in place as part of the final remedy and inside the boundaries of the contaminant plume."

[34] See 55 FR 8753-8754, March 8, 1990. These terms complement one another and generally mean that everything down gradient from the point of compliance or area of attainment should achieve the cleanup level. If the point of compliance is throughout the plume, the area of attainment is the entire plume. If the point of compliance is the unit boundary, then the area of attainment is throughout the plume down gradient of the unit.